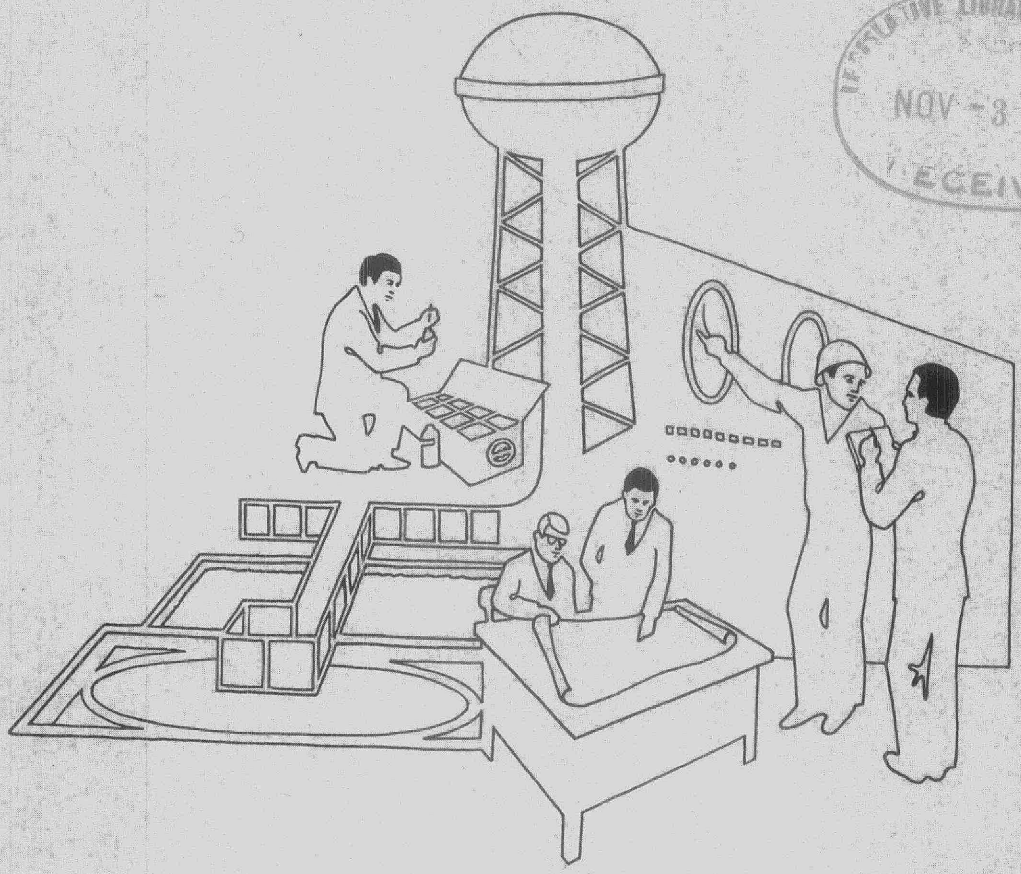
Water pollution survey

Water management in Ontario

Ontario Water Resources Commission

District Engineers Branch



REPORT ON A WATER & WELL POLLUTION SURVEY

OF THE COMMUNITY OF CONSECON

(TOWNSHIPS OF AMELIASBURGH AND HILLIER)

IN THE COUNTY OF PRINCE EDWARD

1971

THE

ONTARIO WATER RESOURCES COMMISSION

REPORT ON A WATER & WELL POLLUTION SURVEY

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REPORT ON A WATER AND WELL POLLUTION SURVEY

OF THE COMMUNITY OF CONSECON

(TOWNSHIPS OF AMELIASBURGH AND HILLIER)

INTRODUCTION:

A study of the ground and surface water conditions in the Community of Consecon was conducted by staff of the District Engineers Branch, Ontario Water Resourses Commission on April 14, 1971. Preliminary meetings were held with Mr. H. Seeley, Hastings and Prince Edward Counties Health Unit to gather information on the condition of individual services. In addition, the residents of the community provided interesting comments which also have been incorporated in the report. The specific objectives of the study were as follows:

1. To determine the quality of water used by the residents in the Community of Consecon for domestic purposes.

2. Locate sources of existing or potential sources of pollution.

3. Make an appraisal of the present facilities and relate their effectiveness for the future. The need for municipal services would also be reviewed.

4. Recommend action that is required to alleviate the pollution problems.

LOCATION, TOPOGRAPHY AND SOIL CONDITIONS:

The Community of Consecon located on Weller Bay and approximately 8 miles south of the Town of Trenton is separated by the Townships of Hillier and Ameliasburgh.

The outstanding feature is Consecon Creek which flows through the centre of the community towards the bay. The topography

is level throughout the built up section with an elevation of 250 feet but in the southerly section the elevation rises to about 300 feet.

The geology of the area is rather consistent with only a shallow mantle of soil covering the underlying limestone bedrock. Generally, rock will be encountered at depths between 1 and 8 feet.

The external and internal drainage of the soil is good, however, because of the low clay and organic matter content there is a tendency for it to suffer from summer drought.

POPULATION, PROPOSED GROWTH AND INDUSTRY

The population of the community has been estimated at approximately 300. Mr. W. Nightingale, Clerk, Ameliasburgh Township when contacted reported that one or two homes are being built each year in the community which is resulting in about a 1% growth rate. This trend is expected to continue.

The only industry within the community, United Canners Co. Ltd. operates normally for 5 weeks during the year.

EXISTING SERVICES AND GROUNDWATER CONDITIONS

At present the residents depend on septic tank systems to treat the domestic waste.

From the wells penetrating into the fractured limestone yields in the area of 6 gpm are expected.

WELL SURVEY

INTRODUCTION

An attempt was made to obtain a bacteriological sample from each well in the village and although not entirely successful in this regard staff felt a relatively good number were collected.

Similarily, chemical samples were collected at random from a statistically representative number of wells and analyzed for hardness, alkalinity, iron, chlorides, pH, total nitrogen, total phosphorus and sulphate.

The bacteriological samples were analyzed at the Ontario Department of Health Laboratory in Kingston while the chemical samples were analyzed by the Ontario Water Resources Commission Laboratory at Highway 401 and Islington, Toronto. All analyses were conducted according to "Standard Methods."

BACTERIOLOGICAL RESULTS

A summary of the well survey is presented in Table 1.

Table 1 - Summary of the Well Survey in the Community of Consecon - Townships of Ameliasburgh and Hillier.

Number of Wells Sampled	47
Number of Drilled Wells	24
Number of Dug Wells	23
Other	0
* Samples Satisfactory	21 (45%)
** Samples Doubtful	3 (6%)
*** Samples Unsatisfactory	23 (49%)

* Satisfactory (total coliform organisms = 0)
(fecal coliform organisms = 0)

** Doubtful (total coliform organisms = Present)
(fecal coliform organisms = 0)

*** Unsatisfactory (total coliform bacteria = Present)
(fecal coliform bacteria = Present)

The presence of coliform bacteria without fecal bacteria (doubtful) indicates that there may or may not be pollution of

intestinal origin and water under this classification should not be consumed until further samples are obtained. The presence of fecal bacteria in domestic water supplies is regarded as being severe enough to render the water potentially dangerous and should not be consumed unless treated.

Every resident who had his well sampled and the results indicated the presence of fecal and/or total coliforms was sent a letter, a copy of which is appended to the report. In the letter suggestions were presented outlining measures that should be taken to perhaps restore the well to a working condition.

CHEMICAL RESULTS

Chemical results were collected from six drilled wells (depths 30 - 50 feet) and two dug wells (depths 12 - 15 feet).

As expected, the quality of water varied quite dramatically throughout the community. Many residents complained of salty, gaseous and sulphureous water which resulted in some cases of complete rejection of the supply.

All of the wells sampled revealed an extremely hard water supply. The recommended iron concentration of 0.3 ppm was exceeded in three of the eight samples. It has been stated that chloride concentrations greater than 100 ppm will impart a salty taste to the water. Using this criteria, the remarks related to salty water are justified. In fact, the one well with a chloride concentration of 7,540 ppm as indicated in Appendix Three is not at present being used for domestic purposes.

Infant methemoglobinemia, a disease characterized by certain specific blood changes may be caused by high nitrate

concentrations. This has prompted the Ontario Water Resources Commission to recommend that a water supply containing more than 10 ppm nitrate as nitrogen not be used for infant feeding. According to the results in Appendix Three, the water supply from two wells was far in excess of this recommended limit and in another the concentration was 9.3 ppm which is also close to the limit. Further, the presence of appreciable amounts of chloride will result in an erroneously low value of nitrate and this should be considered when interpreting the results.

Therefore, in general the chemical characteristics of the water supplies in the community are not favourable. Where a good well has been obtained sharing the supply with neighbours is a customary practice. To add to the problems, a shortage of water is encountered in the late summer months.

SOURCES OF CONTAMINATION

The close proximity of septic tank systems to the water-supply wells has no doubt contributed to the contamination of some wells. Our Water & Well Management Branch conducted a further survey on June 24, 1971 of the most severely contaminated wells and their conclusion strengthened this assumption.

In the relatively older centres of Ontario such as Consecon the wells were dug or drilled many years ago and with the passing of time, deterioration of the structures has occurred resulting in the access of contaminated water to the wells. Of the 47 wells sampled, 13 were equipped with sanitary hand pumps which require frequent upgrading and repairing to eliminate the potential sources of contamination. Wells drilled in recent years have been

constructed in a proper manner.

The kind and quantity of mineral matter dissolved in the natural water can determine its usefulness for domestic purposes. In addition, the contact of natural water with organic matter or its decomposing products can be of sufficient magnitude to render the water undesirable and this is exemplified by the high nitrates.

In summary, the reasons for contamination of the groundwater supply are:

1. Close proximity of septic tank systems to the water supply sources.

2. Close proximity of water supply to contamination sources.

3. Deteriorating well structures. Special reference is being made to the sanitary hand pump installation.

4. Contact of the natural water with undesirable mineral constituents, organic matter and decomposing organic matter.

WATER POLLUTION SURVEY AND RESULTS:

Bacteriological and chemical samples were collected at six stations as shown on the appended map.

Results of samples collected from Consecon Creek failed to reveal any serious contamination. However, a small drainage ditch flowing into Consecon Creek from the north did indicate that contamination was originating probably from inadequate sub-surface systems. In the particular area drained by this ditch, there are some extremely small lots (5000 square feet) which cannot adequately support a septic tank system and therefore the presence of high counts of bacteria was not surprising.

Another small drainage ditch flowing past a piggery to Consecon Creek was sampled and the results revealed that leachate from the manure was affecting the quality of water. Field staff of the Ontario Water Resources Commission have inspected the piggery on several occasions and based on the recommended action, improvements have been realized. The operations at the establishment are however still not entirely satisfactory necessitating the Ontario Water Resources Commission recently to instruct the owner to take immediate steps to prevent all leachate from entering the creek. A close surveillance of the piggery will be continued by staff of the Ontario Water Resources Commission.

MUNICIPAL SYSTEM

Many of the residents in the Community of Consecon are using a potentially hazardous and objectionable groundwater supply. To eliminate this crucial situation a public supply system is required. Since the groundwater conditions are poor with respect to the availability of the resource for municipal purposes the most likely source of water would be Consecon Creek near the dam on Highway #33. The project would entail the construction of a complete water treatment plant and approximately 7,500 feet of water mains. If such a proposal becomes of reality, the cost to the residents will be quite high even with the financial assistance provided by the Province.

The private sewage systems should be inspected by the residents to ascertain where improvements are required. The installation of a municipal sewage system is impractical, too expensive and undesirable in view of the receiving body of water for the effluent.

SUMMARY

A study of the groundwater and surface water conditions was conducted in the Community of Consecon on April 14 and 15, 1971.

A bacteriological examination of the wells revealed that 45% were satisfactory, 6% were doubtful and 49% were unsatisfactory. The results of chemical samples collected from eight wells within the community were also not too encouraging with the high chloride, nitrate, iron and hardness concentrations. The few wells that were bacteriologically and chemically satisfactory will likely be shared by the residents, a practise which is at present being used. There was no outward interest on the part of the residents for a communal water supply system and therefore it will be absolutely necessary for some residents to obtain water from their neighbour. As stated previously, the construction of a municipal water system would be extremely costly, a burden the residents of the community appear unwilling to accept at this time.

In view of the shallow overburden and a poor groundwater supply, development should be discouraged in the Community of Consecon.

It was concluded that at the time of the investigation there was no serious contamination of Consecon Creek. Unfortunately the same cannot be said of the two drainage ditches flowing to the creek. In one ditch (north of Consecon Creek) the pollution is probably eminating from inadequate subsurface systems while in the second ditch (south of Consecon Creek) the pollution originates from a piggery. Residents in the area should ensure there is no drainage from their sewage systems. The owner of the piggery has

been requested to ensure leachate from his establishment does not reach the creek.

RECOMMENDATIONS

1. Relocation of some septic tank systems away from wells is required before the water can be used for domestic purposes.

2. The structure of the older wells especially those equipped with sanitary hand pumps should be upgraded to prevent the access of contaminated water into the well.

3. The installation of a municipal water supply system would be the ultimate answer but with the expected heavy financial burden on the residents, a willingness to proceed on such a project at this time appears remote. Therefore, all measures should be taken to keep the present adequate wells free of contamination.

4. In view of the water and waste problems, the local land committee should discourage development in the Community of Consecon. Planning goals for the county should be directed around the larger centres which have adequate facilities.

RAD/jmc

Report prepared by. Robt. A. Dunn

R.A. Dunn, P. Eng.,
Division of Sanitary Engineering.

APPENDIX ONE

Copy of Letter Sent to Municipality Outlining Date of Survey

March 25, 1971.

The Corporation of the Township of Hillier,
R.R. 2,
HILLIER, Ontario.

Attention: Mr. G. Lloyd, Reeve

Dear Mr. Lloyd:

Re: Community of Consecon -
Private Well Survey

This letter is to advise your office that field staff of this Commission and your local health unit have made arrangements necessary to carry out a private well survey, door to door, in the Community of Consecon on April 14, 1971.

It would be appreciated if the residents of Consecon could be advised, through your offices, that the foregoing will take place. Your co-operation in this respect would be greatly appreciated and if there are any questions raised in the foregoing, please do not hesitate to contact this office.

Yours very truly,

CLY/jmc

L.G. South, P. Eng.,
District Engineer,
Division of Sanitary Engineering.

APPENDIX TWO

Copy of Letter to Residents in Community of Consecon Informing Them of Bacteriological Results

April 26, 1971.

Dear

Re: Community of Consecon -
Private Well Survey

The result of the examination performed on the bacteriological sample taken from your drinking water supply during the week of April 12, 1971 indicated that it is unsatisfactory - doubtful. Therefore, in conjunction with Mr. H. Seeley, C.P.H.I.(C) Hastings & Prince Edward Counties Health Unit, 18 Elizabeth St., Picton - 476-3472, we would suggest that the following be carried out to ensure that your water supply is safe for human consumption.

If the sample taken from your water supply was

a) unsatisfactory - we suggest that this water should not be used for drinking purposes without *treatment. The examination of the sample revealed the presence of fecal coliform organisms, which indicate contamination of your supply from an intestinal origin.

b) doubtful - we would suggest that this water should be *treated prior to human consumption until further bacteriological samples indicate that this water supply is safe for use. The examination of this sample revealed the presence of coliform organisms which may or may not, indicate contamination of supply from an intestinal origin.

* Treatment of your supply should consist of either proper chlorination or boiling the water, at a full roll, for at least five (5) minutes prior to consumption.

Any questions raised in the foregoing, assistance required with respect to the interpretation of this correspondence, or re-sampling of your water supply should be directed to Mr. H. Seeley of your local health unit or this office.

Yours very truly,

CLY/lc

L.G. South, P. Eng.,
District Engineer,
Division of Sanitary Engineering.

APPENDIX THREE

CHEMICAL ANALYSIS OF WELLS SAMPLED IN THE COMMUNITY OF CONSECON

APRIL 14, 1971

SAMPLE NO.	HARDNESS AS $CaCO_3$	ALKALINITY AS $CaCO_3$	IRON AS FE	CHLORIDE AS CL	pH at LAB.	NITRATE AS N	TOTAL PHOSPHORUS AS P	SULPHATE AS SO_4
W-1	372	274	0.05	85	7.4	3.50	0.006	47
W-2	266	268	0.35	71	7.5	0.01	0.004	64
W-3	342	248	0.05	112	7.2	9.30	0.360	40
W-4	288	246	0.15	15	7.3	6.30	0.480	26
W-5	592	276	1.60	548	7.4	22.00	0.078	76
W-6	3720	156	0.55	7540	7.1	0.02	0.056	1
W-7	264	220	0.10	145	7.5	3.40	0.096	16
W-8	384	264	0.15	111	7.1	26.00	2.000	42

W-1 Mrs. J. Brownell, Mill St. - Drilled Well

W-2 Mr. C. Phillips, Victoria Ave., - Drilled Well

W-3 Mrs. C. Bush, Church St., - Drilled Well

W-4 Mr. W. Mattis, Dug Well

W-5 Mr. J. Smith, Lot 106 Ameliasburgh - Dug Well

W-6 Mr. E. Windle, Mill St.- Drilled Well

W-7 Mr. H. Wannamaker, Mill St. - Drilled Well

W-8 Mr. F. Walker, Main St. - Drilled Well

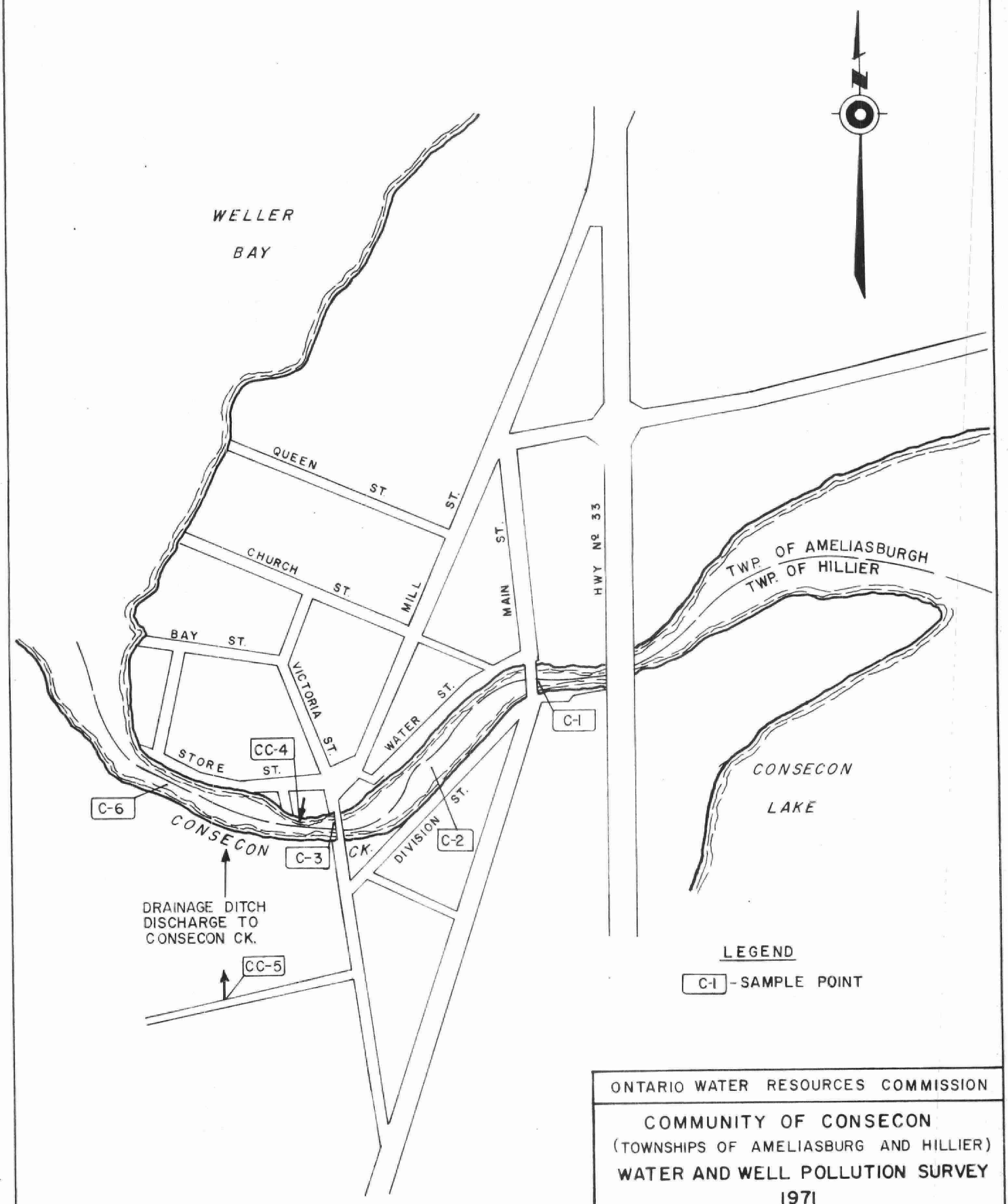
APPENDIX FOUR

BACTERIOLOGICAL AND CHEMICAL ANALYSIS OF SAMPLES COLLECTED IN THE COMMUNITY OF CONSECON

SAMPLE POINT NO.	DESCRIPTION	5-DAY BOD	SOLIDS			NITROGEN AS N				PHOSPHORUS AS P.		BACTERIOLOGICAL EXAMINATION PER 100 ML		
			TOTAL	SUSP.	DISS.	FREE AMMONIA	TOTAL KJELDAHL	NITRITE	NITRATE	TOTAL	SOLUBLE	TOTAL COLIFORM	FECAL COLIFORM	FECAL STREPTOCOCCUS
C1	Consecon Cr. at Main St.	1.4	210	5	205	L0.01	0.47	0.010	0.29	0.016	0.002	L10	L10	L10
C2	Consecon Cr. 525' west of Main St. Bridge	1.8	230	5	225	L0.01	0.44	0.010	0.29	0.016	0.003	10	L10	L10
C3	Consecon Cr. at Old Hwy. #33	1.4	210	5	205	L0.01	0.43	0.010	0.27	0.016	0.003	L10	L10	L10
CC4	Small Drainage Ditch North of Consecon Cr.	12.0	500	35	465	-	1.50	-	-	2.000	-	3900	760	L10
CC5	Drainage ditch at the Beach Road	1.6	360	5	355	0.02	0.74	0.020	0.82	0.480	0.030	10800	30	L10
C6	Consecon Cr. just before terminating in Weller Bay	1.4	210	5	205	L0.02	0.45	0.020	0.27	0.066	0.039	20	L10	L10

L means less than

All analyses in ppm unless otherwise indicated.



ONTARIO WATER RESOURCES COMMISSION

COMMUNITY OF CONSECON
(TOWNSHIPS OF AMELIASBURG AND HILLIER)
WATER AND WELL POLLUTION SURVEY
1971

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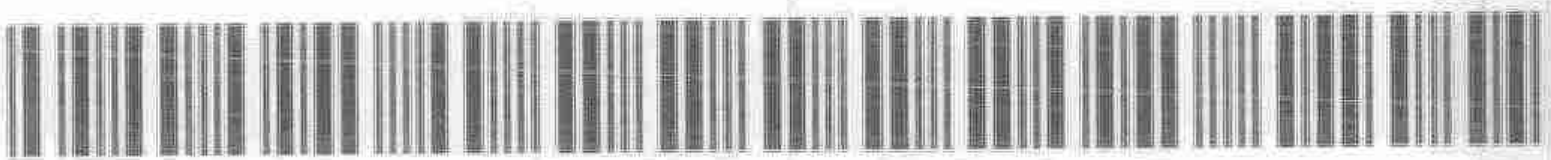
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